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Operational Telecardiology

The rapid expansion of digital image technology has revolutionized data archiving and interpretation in cardiovascular applications. This technology also presents the potential for the rapid transmission of image data from remote sites capable only of study performance to Medical centers (MEDCEN) capable of study interpretation. Such capabilities have broad operational and routine implications, providing medical facilities with rapid access to expert consultations, which in turn facilitate diagnosis and minimize delays in appropriate triage and treatment. Two-dimensional echocardiography/Doppler technology has evolved in the direction of digital image archiving, recognizing the potential superiority of this technology over conventional videotaped image storage in terms of both image quality and accessibility for future comparisons, research applications and data transfer.

Our study compared the Motion Picture Experts Group (MPEG)-1 compression standard with the S-VHS video echocardiography standard. Studies in both formats were interpreted by a group of blinded readers in a random fashion. Predetermined major and minor discrepancies were established prior to the investigation, and intra- and inter-reader variability with respect to these discrepancies were the primary focus of analysis.

Transmission of MPEG-1 echo files is limited by both the data transfer rates available over conventional network connections and by the large file size (on average 40 MB) required for a complete echo/Doppler exam. Our study is a prospective, randomized control trial examining the concordance of echocardiograph readings from VHS tape as compared to digitized MPEG files compressed at various rates. In order to further assess the adequacy of remote consults, the readings of two separate readers are compared for diagnostic concordance. To account for intra-reader variation the original consultants will reread the same echo in the alternative format after a period of no less than 90 days. The VHS reading is the current "standard of care" and will be used for the formal consultation. The digitized readings will serve as a redundant system for study purposes, although major discrepancies will be resolved between the two consultants to ensure good clinical care.

Concordance between MPEG-1 and S-VHS was exact in 83% of cases. Major discrepancies, classified as those in which a change in diagnosis resulted, occurred in 2.7% of cases. The authors concluded that MPEG-1 was equivalent to S-VHS in routine diagnostic echocardiography.

To date, we have completed more than 150 consults using MPEG-1 format between Dewitt Army Community Hospital in Ft. Belvoir, VA and the Walter Reed Army Medical Center Cardiology Service. So far, no major discrepancies have been noted; data from intra-reader comparison is not yet available.

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Funded by
USAMRMC/Telemedicine and
Advanced Technology
Research Center